
Clock Controller installation

There are three steps to installing a Clock Controller:

- 1 Determine the location of the Clock Controller card (shelf and slot).
- 2 Set the switches on the card.
- 3 Insert the card and connect the cables. This step may also entail removing an old card.

This chapter describes this process.

CAUTION

Do not deviate from the procedures described in this section, as deviation stops call processing.

Determining slots and shelves

The Clock Controller card installation site varies from system to system.

Table 2 shows the systems, the shelves used, and the available slot or slots.

Table 2
Clock Controller shelves and slots

System	Shelf	Slot(s)
ST, STE	CE	5–12
MS	CE	9
RT	network	13
N, NT	QSD39 network (LH) QSD40 network (RH)	13 2
XN	QSD17 CPU	14
XT	QSD62	15
21, 21E	NT8D11 CE/PE Module	4–5
51, 61	NT6D39 CPU/Net Module	9
51C, 61C	NT5D21 CPU/Net Module	9
71	NT8D34 CPU Module	14
81	NT6D60 Core Module	6
81C	NT8D35 Network Module QSD39 network QSD40 network	13 2 13

Before installing a Clock Controller, set the switches as shown in **Tables 3** through **7**. **Tables 3, 4, and 5** display the settings for different vintages of the QPC471 Clock Controller card. **Tables 6 and 7** show the settings for the QPC775 Clock Controller card.

Table 3
QPC471 vintage A switch settings

System	Switch	Setting
N, NT, RT	SW2	on
XN, XT	SW2	off
Vintage A applies only to these systems		

Table 4
QPC471 vintage B through G switch settings

Switch or Jumper	MS	ST, STE, 21A, 21	N, NT, RT, 51, 61	XN, XT, 71
SW1	on	on	on	off
SW2	on	off	off	off
Jumper F38	TP9-TP10	TP8-TP9	TP8-TP9	TP8-TP9
Jumper G38	TP12-TP13	TP11-TP12	TP11-TP12	TP11-TP12

Table 5
QPC471 vintage H switch settings

System	SW1				SW2				SW4			
	1	2	3	4	1	2	3	4	1	2	3	4
ST, STE, 21A, 21, 21E	on	on	on	on	off	off	off	off	off	off	off	off
MS, SN	on	on	on	on	on	on	on	on	off	off	off	off
RT, N, NT, 51, 51C, 61, 61C	on	on	on	on	off	off	off	off	off	on	*	*
XN, XT, 71, 81	off	off	off	off	off	off	off	off	off	on	*	*
81C	on	off	off	off	off	off	off	off	**	on	*	*
					Cable length between the J3 faceplate connectors:							
					0–4.3 m (0–14 ft)						off	off
					4.6–6.1 m (15–20 ft)						off	on
					6.4–10.1 m (21–33 ft)						on	off
					10.4–15.2 m (34–50 ft)						on	on
* If there is only one Clock Controller card in the system, set to OFF. If there are two Clock Controller cards, set to match the cable length between the J3 faceplate connectors. Determine the total cable length (no single cable can exceed 25 ft) between the J3 connectors. Both cards must have the same setting.												
** Set to ON for clock controller 0. Set to OFF for clock controller 1.												

Table 6
QPC775 switch settings

System	SW2				SW3				SW4			
	1	2	3	4	1	2	3	4	1	2	3	4
XN, XT, 71, 81, 81C	off	off	off	off	off	off	off	off	on	on	on	on
N, NT, RT, ST, STE, 21A, 21, 21E, 51, 51C, 61, 61C	on	on	on	on	off	off	off	off	on	on	on	on
MS, SN	on	on	on	on	on	on	on	on	off	off	off	off

Table 7
QPC775 vintage E switch settings

System	SW2				SW3				SW4					
	1	2	3	4	1	2	3	4	1	2	3	4		
ST, STE, 21A, 21, 21E	on	on	on	on	off	off	off	off	off	off	off	off		
MS	on	on	on	on	on	on	on	on	off	off	off	off		
RT, N, NT, 51, 51C, 61, 61C	on	on	on	on	off	off	off	off	off	on	*	*		
XN, XT, 71, 81	off	off	off	off	off	off	off	off	off	on	*	*		
81C	on	off	off	off	off	off	off	off	**	on	*	*		
					Cable length between the J3 faceplate connectors:									
					0–4.3 m (0–14 ft)								off	off
					4.6–6.1 m (15–20 ft)								off	on
					6.4–10.1 m (21–33 ft)								on	off
					10.4–15.2 m (34–50 ft)								on	on
* If there is only one Clock Controller card in the system, set to OFF. If there are two Clock Controller cards, set to match the cable length between the J3 faceplate connectors. Determine the total cable length (no single cable can exceed 25 ft) between the J3 connectors. Both cards must have the same setting.														
** Set to ON for clock controller 0. Set to OFF for clock controller 1.														

Replacing a Clock Controller

See step 2 in the **Procedure 1, 2, and 3** for instructions on how to replace a Clock Controller card.

Do not disable an active clock or a clock associated with an active CPU.

Installing a Clock Controller

Be sure to inspect the Clock Controller card before installing it. Refer to the tables at the beginning of this chapter for shelf, slot, and switch setting information. Remember, do not use both the QPC471 and the QPC775 on a single system. QPC471 vintage H cards cannot be mixed with cards of an earlier vintage.

Starting the Clock Controller

The Clock Controller, when first enabled, is in free run mode. It stays in this mode for several minutes before being switched to tracking mode. Manual intervention is possible if the capability has been set in LD 60.

For the earlier QPC471 vintages, up to 20 minutes may pass before the clock locks and tracks. The QPC471 vintage G and H cards begin tracking within 5 minutes.

Clock Controller commands

During the installation procedure, you will use some of the Clock Controller commands available in LD 60. In the following list of commands, “x” refers to the Clock Controller number: 0 for the card associated with CPU0, 1 for the card associated with CPU1.

- DIS CC x: disable system Clock Controller x
- DSCK loop: disable clock for specified loop
- DSYL loop: disable yellow alarm processing for specified loop
- ENCK loop: enable clock for specified loop
- ENL CC x: enable system Clock Controller x
- ENYL loop: enable yellow alarm processing for specified loop
- EREF: enable automatic switchover of system clocks
- SSCK x: obtain status of system clock x
- SWCK: switch system clock between active and standby
- TRCK aaa: set Clock Controller track where aaa can be PCK (the primary DTI/PRI reference), SCLK (the secondary DTI/PRI reference) or FRUN (free running)

Procedure 1

Installing the Clock Controller in the ST, STE, 21, 21E, MS, N, RT, 51, and NT half group

Note: Refer to the tables in this chapter to be sure you are using the correct vintage.

- 1 Set the ENL/DIS toggle switch to DIS (disable) on the new circuit card.
- 2 If replacing an existing card, follow these steps:
 - Perform a status check on the clock with the SSK command in LD 60. The new controller should have the same status.
 - Disable the old card using LD 60.

Note: ERR20 messages may be generated. These can usually be ignored. However, excessive clock switching should be avoided, especially when counters are near the maintenance or out-of-service thresholds. Excessive switching could generate threshold-exceeded messages or cause the PRI to be automatically disabled. Check the counters in LD 60. If necessary, reset the counters using the RCNT command.

- Set the old card's faceplate ENL/DIS switch to DIS.
- Disconnect cables from the old Clock Controller card and remove the card from the shelf.

Note: The Clock Controller status display in this mode indicates NO UART (no universal asynchronous receiver transmitter). Do not perform a clock status check when receiving this code.

- 3 Install the new Clock Controller in the selected slot.
- 4 Connect the cables to the new card.
 - Connect the primary reference to J2.
 - If applicable, connect the secondary reference to J1.
- 5 Set the faceplate ENL/DIS switch to ENL (enable).

- 6 Set the error detection thresholds and clock synchronization control in LD 73. (This step is optional if replacing a pack but required with a new installation.)
- 7 Enable the Clock Controller by entering ENL CCx in LD 60.
- 8 To track on a primary or secondary reference clock, use LD 60. The command is
TRCK PCK (for primary)
SCLK (for secondary)
FRUN (for free run)
- 9 Issue the SSCK command to check controller status.

Installing the Clock Controller in a single group

Procedure 2

Installing the Clock Controller in the NT and 61

- 1 Set the faceplate ENL/DIS switch to DIS (disable) on the new circuit card.
- 2 If replacing an existing card, follow these steps:
 - Perform a status check on the clock with the SSK command. The new card should have the same status.
 - Disable the old card using LD 60. Use software to disable a card only if the card is associated with a standby CPU and is in standby state.

Note: ERR20 messages may be generated. These can usually be ignored. However, excessive clock switching should be avoided, especially when counters are near the maintenance or out-of-service thresholds. Excessive switching could generate threshold-exceeded messages or cause the PRI to be automatically disabled. Check the counters in LD 60. If necessary, reset the counters using the RCNT command.

- Set the old card's faceplate ENL/DIS switch to DIS.
- Disconnect the cables from the old Clock Controller card and remove the card from the shelf.

Note: The Clock Controller status display in this mode indicates NO UART (no universal asynchronous receiver transmitter). Do not perform a clock status check when receiving this code.

- 3 If the 3PE switches have not been modified to recognize the Clock Controller card, adjust them as follows:

QSD39 (left-hand side)
SW1 OFF (OPT 61 shelf 0)
SW2 ON
SW4 OFF

QSD40 (right-hand side)
SW1 OFF (OPT 61 shelf 1)
SW2 ON
SW4 OFF
SW8 OFF

- 4** Set the faceplate ENL/DIS switch to DISABLE.
- 5** Install the Clock Controller in the selected slot.
- 6** Run and connect the cables.
 - Connect the primary reference to J2.
 - If available, connect the secondary reference to J1.
 - Connect the cable between the two clocks to J3 on each controller card.
- 7** Set the faceplate ENL/DIS switch to ENL.
- 8** Enable the Clock Controller by entering ENL CC x in LD 60.
- 9** Set the error detection thresholds and clock synchronization controls in LD 73. (This step is optional in a replacement but required in a new installation.)
- 10** To track on a primary or secondary reference clock, use LD 60. The command is
 - TRCK PCK (for primary)
 - SCLK (for secondary)
 - FRUN (for free run)
- 11** Issue the status check command, SSCK.
- 12** Activate the new Clock Controller with the LD 60 SWCK command.
- 13** Repeat, if necessary, for the second Clock Controller.

Procedure 3

Installing the Clock Controller in the XN, XT, 71, 81, and 81C

Note: The option 81 and option 81C systems require a QPC471 vintage H Clock Controller card or a QPC775 vintage E Clock Controller card.

- 1 Set the faceplate ENL/DIS switch to DIS on the new circuit card.
- 2 If replacing an existing card, follow these steps:
 - Perform a status check on the clock with the SSCK command. The new card should have the same status.
 - Disable it using LD 60. Use software to disable a card only if the card is associated with a standby CPU and is in standby state.

Note: ERR20 messages may be generated. These can usually be ignored. However, excessive clock switching should be avoided, especially when counters are near the maintenance or out-of-service thresholds. Excessive switching could generate threshold-exceeded messages or cause the PRI to be automatically disabled. Check the counters in LD 60. If necessary, reset the counters using the RCNT command.

- Set the old card's faceplate ENL/DIS switch to DIS.
- Disconnect the cables from the old Clock Controller card and remove the card from the shelf.

Note: The Clock Controller status display in this mode indicates NO UART (no universal asynchronous receiver transmitter). Do not perform a clock status check when receiving this code.

- 3 Set the faceplate ENL/DIS switch to DIS.
- 4 Verify the switch settings on the Clock Controller card. See [Table 5, "QPC471 vintage H switch settings," on page 16](#) or [Table 7, "QPC775 vintage E switch settings," on page 17](#) for a list of Clock Controller switch settings.
- 5 Install the Clock Controller in the selected slot. The slot locations varies from system to system. For a list of clock controller slot locations, refer to ["Determining slots and shelves" on page 14](#).

- 6** Run and connect the cables.
 - Connect the primary reference to J2.
 - If available, connect the secondary reference to J1.
 - Connect the cable between the two clocks to J3 on each controller card.
- 7** Set the faceplate ENL/DIS switch to ENL.
- 8** Enable the Clock Controller by entering ENL CC x in LD 60.
- 9** Set the error detection thresholds and clock synchronization controls in LD 73. (This step is optional in a replacement but required with a new installation.)
- 10** To track on a primary or secondary reference clock, use LD 60. The command is
 - TRCK PCK (for primary)
 - SCLK (for secondary)
 - FRUN (for free run)
- 11** Issue the status check command, SSCK.
- 12** Activate the newly installed Clock Controller with the LD 60 SWCK command.
- 13** Repeat, if necessary, for the second Clock Controller.

Cabling requirements

Clock Controllers can require three different kinds of cable connections:

- In a single-controller system, cable QCAD130 or NT8D79xx connects QPC720/QPC472 (PRI or DTI card) to QPC471/QPC775 at J2 when DTI/PRI is the primary reference clock source.
- In a single-controller system, cable QCAD130 or NT8D79xx connects QPC720/QPC472 to QPC471/QPC775 at J1 when DTI/PRI is the secondary reference clock source.
- With dual controllers, cable QCAD125 or NT8D75xx connects the Clock Controller cards to each other at J3 in single- group mode.

NT8D74 Clock Controller to InterGroup cable

This cable connects the QPC471 or QPC775 Clock Controller card to the NT8D36 InterGroup Module.

This cable is available in the following lengths:

- NT8D74AC 1.2 m (4 ft)
- NT8D74AD 1.8 m (6 ft)
- NT8D74AE 2.4 m (8 ft)
- NT8D74AF 3 m (10 ft) (QCAD110B)
- NT8D74AJ 4.8 m (16 ft)

NT8D75 Clock Controller to Clock Controller cable

This cable connects QPC471 Clock Controller cards to each other.

This cable is available in the following lengths:

- NT8D75AC 1.2 m (4 ft)
- NT8D75AD 1.8 m (6 ft)
- QCAD125 3 m (10 ft)

NT8D79 PRI/DTI to Clock Controller cable

This cable connects the PRI/DTI card to the QPC471 Clock Controller card.

This cable is available in the following lengths:

- NT8D79AB 0.6 m (2 ft)
- NT8D79AC 1.2 m (4 ft)
- NT8D79AD 1.8 m (6 ft)
- NT8D79AE 2.4 m (8 ft)
- NT8D79AF 3 m (10 ft) (QCAD130)

Meridian 1
Digital Clock Controllers
Installation and administration

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Publication number: 553-3001-111

Document release: Standard 3.00

Date: December 1995

Printed in the United States of America